

**SECTION 083300
VERTICAL ACTING FIRE SHUTTER**

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.02 SUBMITTALS

- A. Procedures: Furnish submittals in accordance with the general requirements specified.
- B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each door.
- C. Certifications:
 - 1. Submit manufacturer's Underwriters Laboratories (UL), Warnock Hersey (WH) or Factory Mutual Research (FM) laboratory test report verifying product compliance in accordance with the required fire and smoke ratings.
 - 2. Submit manufacturer's Code Compliance Research Report published by an independent third-party testing agency that is certified by the International Accreditation Service confirming compliance of the fire door assembly in accordance with the International Building Code.
- D. Product Literature: Submit manufacturer's technical literature describing the product to be used under this section.
- E. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all doors under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

1.03 QUALITY ASSURANCE

- A. Fire & Smoke Rated Assemblies: Provide all doors with fire and smoke resistance rating required to comply with governing regulations which are inspected, tested, listed and labeled by UL, WH or FM and complying with NFPA 80 for class of opening. Provide units tested in accordance with the requirements of UL 10B, UL 1784, NFPA 252, ASTM E-152. Provide testing laboratory label permanently fastened to each fire and smoke door assembly.
- B. Regulatory Requirements:
 - 1. Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
 - 2. Listed under a certified Code Compliance Research Report in accordance with the applicable sections of the International Building Code.
- C. Testing: Provide documentation from a certified testing agency that the fire door's self-closing governor mechanism and fire door operator have been tested for a minimum of 50,000 cycles and 500 self closing trip tests.
- D. Manufacturer Requirements: Door manufacturer shall have been in the business of and have experience in manufacturing the type of product covered under this specification section as well as giving credible service for a minimum of five (5) years. Provide list of at least ten (10) completed projects which include the products covered under this section.

1.04 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance

with manufacturer's instructions.

1.05 WARRANTY

- A. Door Warranty: Provide Two (2) Year Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Curtain: Shall be assembled of interlocking G90 galvanized steel slats, cold rolled. Slats shall have endlocks locking each end of alternate slats to act as a wearing surface and maintain slat alignment. Curtain shall be 22 gauge minimum or gauge required by UL, WH or FM which ever is greater.
 - 1. Slats: Shall be of a cross section not less than 3" wide by 7/8" deep.
- B. Bottom Bar: Shall consist of two (2) angles, each not less than 2" x 2" x 1/8" steel formed to fit slats.
- C. Guides: Each guide assembly shall be fabricated of a minimum 3" x 3" steel support angle or tube, a 2" x 3" inner guide angle and a 3" x 3" outer guide angle. Support tubes shall be constructed with a slip joint at the top to provide for thermal expansion and guide angles shall be provided with slotted holes to allow for thermal expansion.
 - 1. Provide internal, fully concealed UL Classified smoke seals located within each guide assembly. Externally mounted smoke seals shall not be acceptable.
- D. Mounting Brackets: Fabricated of hot rolled 3/16" steel plate minimum, brackets shall be provided to house ends of the counterbalance barrel assembly.
- E. Hood: Shall be provided to entirely enclose curtain and counterbalance barrel assembly. Hood shall be fabricated 22 gauge G90 galvanized steel and designed to match brackets. Top and bottom shall be bent and reinforced for stiffness.
 - 1. Provide UL Classified lintel smoke seals.
- F. Counterbalance Assembly: Fire door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.
- G. Electric Motor Operator: Fire door shall be provided with a compact power unit designed and built by the door manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency planetary gearing running in an oil bath, shall be furnished together with a centrifugal governor, magnetic operated brake and a fail-safe magnetic release device, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.
 - 1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/3hp minimum or of manufacturer's recommended size, which ever is greater.
 - 2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
 - 3. Reducer: Planetary gear type, 80% efficiency minimum.
 - 4. Brake: Magnetically activated, integral within the operator's housing.
 - 5. Control Station: Provide flush mount key switch control station marked open, close and stop.

- H. Self-Closing Mechanism: The fire door is to be designed with a centrifugal governor as an integral part of the operator's construction. The automatic release mechanism shall be activated by a fusible link, smoke detector or fire alarm. When activated the door is released and begins to close due to gravitational force. The speed of the door is governed by a centrifugal governor, designed to match the normal operating speed of the door, at a rate of not greater than 9" per second or less than 6" per second.
- I. Magnetic Release with 10 Second Time Delay: A fail-safe magnetic release device shall be built into the operator as an integral part of the release mechanism. When power is interrupted to the release mechanism by the smoke detector or fire alarm, the door shall begin to self-close. In the event of power failure the time delay shall prevent the fire door from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the fire door shall self-close. Once power has been restored to the release mechanism the automatic reset time delay as well as the fire door shall automatically reset themselves.
- J. Obstruction Sensing Safety Edge: The fire door shall be designed with an obstruction sensing safety edge. In the event that the safety edge meets an obstruction during the normal closing operation, the door shall stop, reverse and return to the open position. In the event the safety edge meets an obstruction during the self-closing operation, the door shall come to rest on the obstruction and once the obstruction has been removed the fire door shall continue to the fully closed position.
- K. Easy Trip Test Feature: The fire door shall be designed so that it may be trip tested simply by cutting power to the operator. By turning the power switch off, the door shall self-close. Once the fire door has satisfactorily closed, it shall be reset simply by turning the power back on. No ladders or tools shall be needed to reset the door or the time delay unit.
- L. True Test Panel: Fire doors shall be provided with a True Test panel. The test panel shall activate all the fire doors to close via gravity not power and shall be in accordance with NFPA Bulletin 80. Only one test panel shall be required to test all the fire doors on this project.
- M. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. Curtain assembly is to receive a prime coat finish of .2 mils of epoxy primer and .8 mils of polyester paint in a McKEON Sterling Gray finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.
- B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.
- C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.02 INSTALLATION

- A. Perform installation using only factory approved and certified representatives of the door manufacturer.
- B. Install door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.
- C. Adjust door installation to provide uniform clearances and smooth non-binding operation.
- D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

- E. Test door closing sequence when activated by the building's fire alarm system. Reset door after successful test.

3.03 PROTECTION AND CLEANING

- A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.
- B. Remove, repair or replace materials which have been damaged in any way.
- C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SECTION

**SECTION 084513
TRANSLUCENT WALL ASSEMBLIES**

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Section includes requirements for translucent wall and roof assemblies as shown and specified herein.

1.02 WORK INCLUDED

- A. Design, engineer, manufacture and installation of double glazed insulated translucent wall and roof assemblies.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.03 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of translucent roof and wall assemblies for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.04 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section 013000.
- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929-3).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).

8. Large missile Test – Impact resistance (SFBC PA 201-94).
9. Impact Loading (ASTM E-695).
10. Insulation U-Value for Center of Glazing (NFRC 100).
11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
15. Water Penetration (ASTM E-331).
16. Load Bearing Ability (ASTM E-330).
17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
18. Haze for glare measurement (ASTM D-1003).
19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
20. Sound Transmission Loss (STC) per ASTM E413
21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025
22. Class C [Class A] [Class B], roof construction per ASTM E108, FM4770, NFPA 256, UBC 32-7, ULC-S107, UL790
23. [Optional] 5-minute Forced Entry Certification per Department of State, SD-STD-01.01, Revision G (Amended) code 2114.
24. [Optional] Department of Defense Forced Entry Resistance per UFC 4-020-1, DOD Security Engineering Planning Manual.
25. [Optional] DoD Antiterrorism Standard for Buildings per UFC 4-010-01.
26. [Optional] Human Impact resistance per ASTM 695

1.05 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.06 WARRANTY

- A. Provide a single source translucent wall and roof system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.]
- B. Provide the following single source translucent roof system manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.

- c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Basis of design
 1. The design and performance criteria of this job are based on the UniQuad / Quadwall – translucent wall and roof assembly systems as manufactured by Kingspan Light + Air | Architectural Daylighting
 - a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us
- B. Approved Manufacturers
 1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
 2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.02 TRANSLUCENT ROOF ASSEMBLY PERFORMANCE AND APPEARANCE

- A. Glazing construction for weatherability and resistance to buckling and pressure
 1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
 2. Glazing shall be factory sealed to restrict dirt ingress.
 3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
 4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
 5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
 6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
 7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.
 8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM

D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.

- B. Translucent glazing assemblies – Unitized Double Glazed
1. Design, engineer, manufacture, and installation of unitized double-glazed translucent roof system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single panel glazing systems are not acceptable.
 2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.
 3. Panel width shall not exceed 2' to ensure the best performance for wind uplift. Vibration, oil canning and visual appearance. Panels over 2' wide will not be approved.
- C. Thermal and Solar Performance
1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
 2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
 3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.10]
 4. Each glazing assembly shall be thermally broken.
 5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
 6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
 7. Haze measurement minimum of 90% per ASTM D-1003.
 8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
 9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
- D. Translucent Glazing Joint System
1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
 2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
 3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
 4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for materials with flexible finishes – L/60 per ASTM E-330.
- E. Flammability
1. Exterior Glazing
 - a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
 - b. Class A interior flame spread per ASTM E-84
 - c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
 - d. Minimum self-ignition temperature of 1120° per ASTM 1929.
 2. Interior Glazing
 - a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire

- classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.
- 3. Roof Construction Fire Classification:
 - a. System shall be tested and approved as a Class C Roof Assembly [OPTIONAL: Class B, Class A] as defined in IBC Chapter 15 and tested per ASTM E 108 or UL 790.
- F. Impact Resistance
 - 1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.
 - 2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.
 - 3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996).
- G. Sound Transmission Class (STC) Rating, provide materials and construction identical to those tested in assembly indicated according to ASTM E-90 and classified according to ASTM E 413 by an independent agency.
 - 1. Sound Transmission Class (STC): Paired-panel assemblies shall have a minimum overall acoustic value of the following STC:
 - a. Paired-Panel Assembly; 3 Inches (76mm) Thick: STC [23] [26]
 - b. Paired-Panel Assembly; 4 Inches (101mm) Thick: STC 26 [Optional [27] [32] [34] [35] [38] [39] [43]]

2.03 METAL FRAME STRUCTURE

- A. Design criteria shall be per ASCE-7 requirements.
- B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed L/120 for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- C. The skylight framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed L/60 for the unsupported span per IBC Table 1604.3. The skylight will impose reactions to the support construction. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- D. Water penetration: the metal framed skylight shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331
- E. Water test of metal frame structure shall be conducted according to procedures in AAMA 501.2.
- F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.04 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.

- B. Flashing:
 - 1. 5005 H34 Aluminum .040" thick
 - 2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 - 1. [Optional]Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 - 2. [Optional]Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 - 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, translucent roof installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.02 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions an approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.03 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use. Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

SECTION 087100 DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Thresholds.
- D. Weatherstripping and gasketing.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Provide complete description for each door listed.
- D. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- E. Keying Schedule:
 - 1. Submit three (3) copies of Keying Schedule in compliance with requirements established by Owner.
- F. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.
- D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.

1. Closers: Five years, minimum.
2. Exit Devices: Three years, minimum.
3. Locksets and Cylinders: Three years, minimum.
4. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 1. Applicable provisions of federal, state, and local codes.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Applicable provisions of NFPA 101.
 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
 6. Listed and certified compliant with specified standards by BHMA (CPD).
 7. Auxiliary Hardware: BHMA A156.16.
 8. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
- D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See Door Hardware Schedule.
- E. Fasteners:
 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 HINGES

- A. Hinges: Comply with BHMA A156.1, Grade 1.
 1. Provide hinges on every swinging door.
 2. Provide following quantity of butt hinges for each door:
 - a. Doors From 60 inches High up to 90 inches High: Three hinges.

2.03 EXIT DEVICES

- A. Exit Devices: Comply with BHMA A156.3, Grade 1.
 1. Lever design to match lockset trim.
 2. Provide cylinder with cylinder dogging or locking trim.
 3. Provide exit devices properly sized for door width and height.
 4. Provide strike as recommended by manufacturer for application indicated.
 5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.04 LOCK CYLINDERS

- A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 - 1. Provide cylinders from same manufacturer as locking device.
 - 2. Provide cams and/or tailpieces as required for locking devices.
 - 3. Within specific Door Sections, when provisions for lock cylinder are being referenced to this Section, provide specified lock cylinder and keyed to building keying system, unless otherwise indicated.

2.05 HARDWARE MULLION

- A. Hardware Mullion: Provide on double doors. Removable with key.

2.06 CLOSERS

- A. Closers: Comply with BHMA A156.4, Grade 1.
 - 1. Type: Surface mounted to door.
 - 2. Provide door closer on each rated door.
 - 3. Provide door closer on each fire-rated and smoke-rated door.
 - 4. At corridor entry doors, mount closer on room side of door.
 - 5. At outswinging exterior doors, mount closer on interior side of door.
 - 6. Positive stop feature to be incorporated in closer.

2.07 THRESHOLDS

- A. Thresholds: Comply with BHMA A156.21.
 - 1. Provide threshold at interior doors for transition between two different floor types, and over building expansion joints, unless otherwise indicated.
 - 2. Provide threshold at each exterior door, unless otherwise indicated.
 - 3. Type: Flat surface.
 - 4. Material: Aluminum.
 - 5. Threshold Surface: Fluted horizontal grooves across full width.
 - 6. Field cut threshold to profile of frame and width of door sill for tight fit.
 - 7. Provide non-corroding fasteners at exterior locations.

2.08 WEATHERSTRIPPING AND GASKETING

- A. Weatherstripping and Gasketing: Comply with BHMA A156.22.
 - 1. Head and Jamb Type: Adjustable.
 - 2. Door Sweep Type: Encased in retainer.
 - 3. Material: Aluminum, with brush weatherstripping.

2.09 SILENCERS

- A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
 - 1. Single Door: Provide three on strike jamb of frame.
 - 2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
 - 3. Material: Rubber, gray color.

2.10 FINISHES

- A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
 - 1. Primary Finish: 630; satin stainless steel, with stainless steel 300 series base material (former US equivalent US32D); BHMA A156.18.
 - 2. Secondary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
 - a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.

3. Exceptions:
 - a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
 - b. Hinges for Fire-Rated Doors: Steel base material with plated finish, in compliance with NFPA 80.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
 1. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch.
 - b. Push Plates/Pull Bars: 42 inch.
 - c. Deadlocks (Deadbolts): 48 inch.
 - d. Exit Devices: 40-5/16 inch.
 - e. Door Viewer: 43 inch; standard height 60 inch.
- E. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

- A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

- A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION